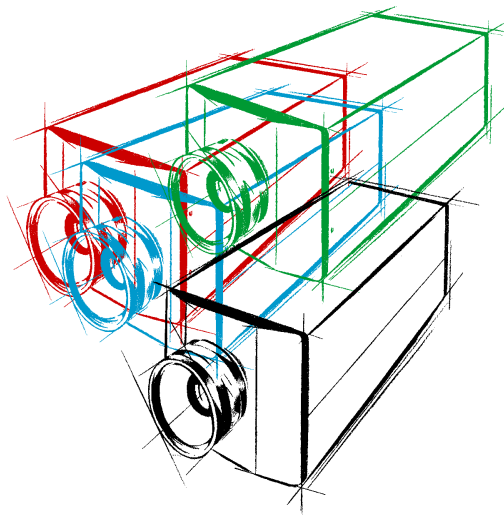


VX44

Operating Instructions



Safety Instructions

For your own safety and in order to guarantee a safe operation of the camera, please read carefully the following information prior to using the device.

- Never operate the camera at places where water or dust might penetrate.
- Place the camera on a sufficiently stable basis.
Shocks like e.g. dropping the camera onto the floor, might cause serious damage to the device. Therefore exclusively the tripod attachment at the bottom side should be used for mounting the camera.
- Always unplug the camera before cleaning it. Do not use cleaning liquids or sprays. Instead, use a dry, soft duster.
- Make sure that the connecting cable is in good condition and that the link to the socket does not represent an obstacle.
- Detach the camera and contact the customer service in the following cases:
 - When cable or plug are damaged or worn-out.
 - When water or other liquids have soaked into the device.
 - When the device is not properly working although you followed all instructions of the user's manual.
 - When the camera fell to the floor or the housing has been damaged.
 - When the device shows apparent deviations of normal operation.

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Operating Instructions VX44
Version 03/99

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1. Introduction

In microscopy, objects of interest are often viewed with little contrast on a bright background. Adjusting the camera offset and increasing the gain can significantly improve object contrast. These functions are directly integrated into the **VX44** to ensure optimum image quality.

The **VX44** video camera is a high performance monochrome video camera, based on a solid state image sensor. The high quality "lens-on-chip" CCD, combined with the offset / gain setting and an advanced electronics, increases sensitivity of the **VX44** substantially, compared with high standard video cameras. An absolute black level is achieved via special darkened reference pixels, yielding a perfect linear relation between light input and output signal.

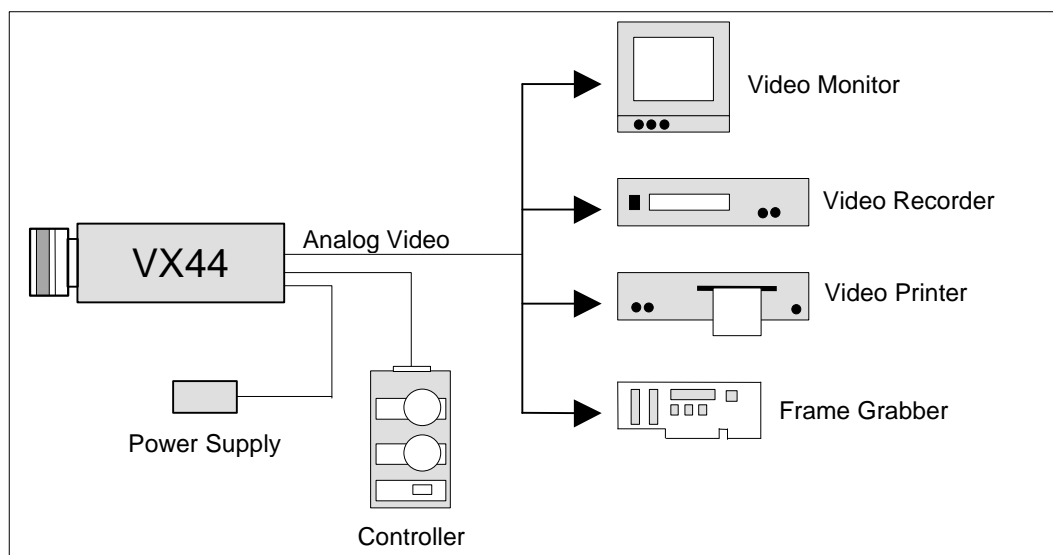
A great number of additional features makes the **VX44** suitable for nearly every application.

The **VX44** is easy to use. The analog video signal is a CCIR, respect. a RS170 standard signal and compatible to the whole video equipment on the market.

The **VX44** is absolutely insensitive against overexposure, i. e. too much light cannot damage the CCD sensor.

1.1 Block Diagram

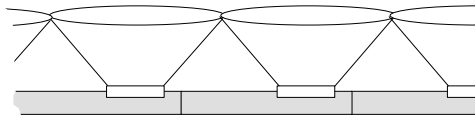
The video output is an analog video signal, according to the CCIR- or RS170-standard. To connect the camera to a peripheral video device (monitor, printer, recorder, frame grabber, etc.) use only 75 Ω cables.



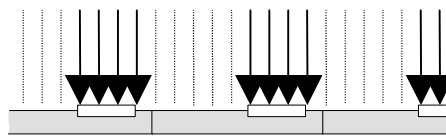
1.2 CCD Sensor

The CCD sensor is an Interline Transfer Sensor with 2/3" format. It has a resolution of 741 x 576 pixels (CCIR) or 756 x 486 pixels (RS170). The pixel size is $11.6\mu\text{m} \times 11.2\mu\text{m}$ (CCIR) or $11.6\mu\text{m} \times 13.5\mu\text{m}$ (RS170).

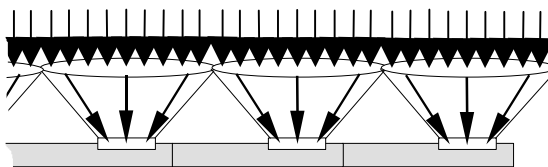
The integrated "lens on chip" increases the sensitivity of about factor 2.



lens on chip on the sensor cells

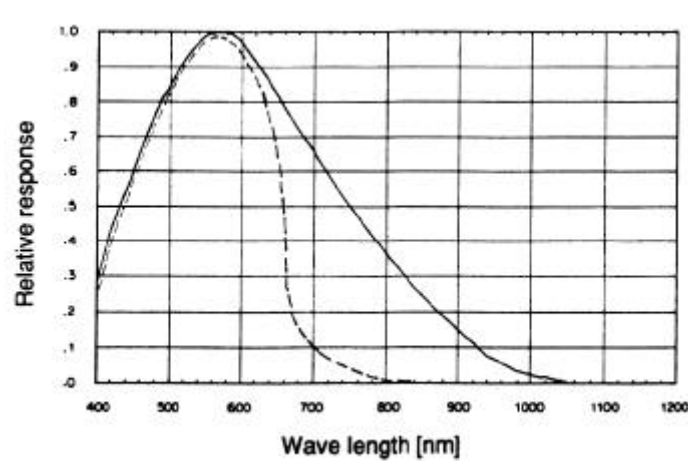


sensor cells without *lens on chip*



sensor cells with *lens on chip*

Spectral Sensitivity of the CCD sensor



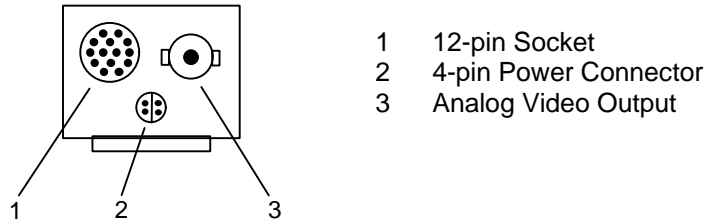
— = without filter

- - - = with infrared cutting filter

The camera can be used with an infrared cutting filter (optional) or without filter.

2. Connections

Back panel of the **VX44**:



2.1 Lens Mount

VX44 uses a C-mount with a standard back focal length of 17.52mm (distance between the front edge of the C-mount insert and the CCD sensor). The C-mount has a fine adjustment to allow for small variations in the focal length of instruments. To adjust to a different back focal length, just loosen the set screw at the bottom of C-mount front plate. Rotate the C-mount insert to the desired position. (The C-mount insert has a 0.5 thread suitable for fine adjustment.) Then secure the insert again by tightening the set screw.

PCO can deliver suitable lenses for all applications (standard, macro, zoom, ...). Give us the dimensions of your object and we will calculate the suitable lens. Call us at +9441/2005-0.

2.2 Power Supply

The power supply (90V ... 260V), delivered with the **VX44**, provides 12V (-5%, +10%). At 12V the power consumption is 440mA. On the power supply a 4-pin special connector is mounted.

2.3 Video Output

The analog video output goes to a BNC socket. It supplies a standard video signal (1V_{pp}, 0.3V Sync-Level on 75Ω) according to CCIR or RS170 standard.

The video signal is compatible to all video equipment (recorder, printer, monitors, ...)

Please use only 75Ω cables (e.g. RG59)!

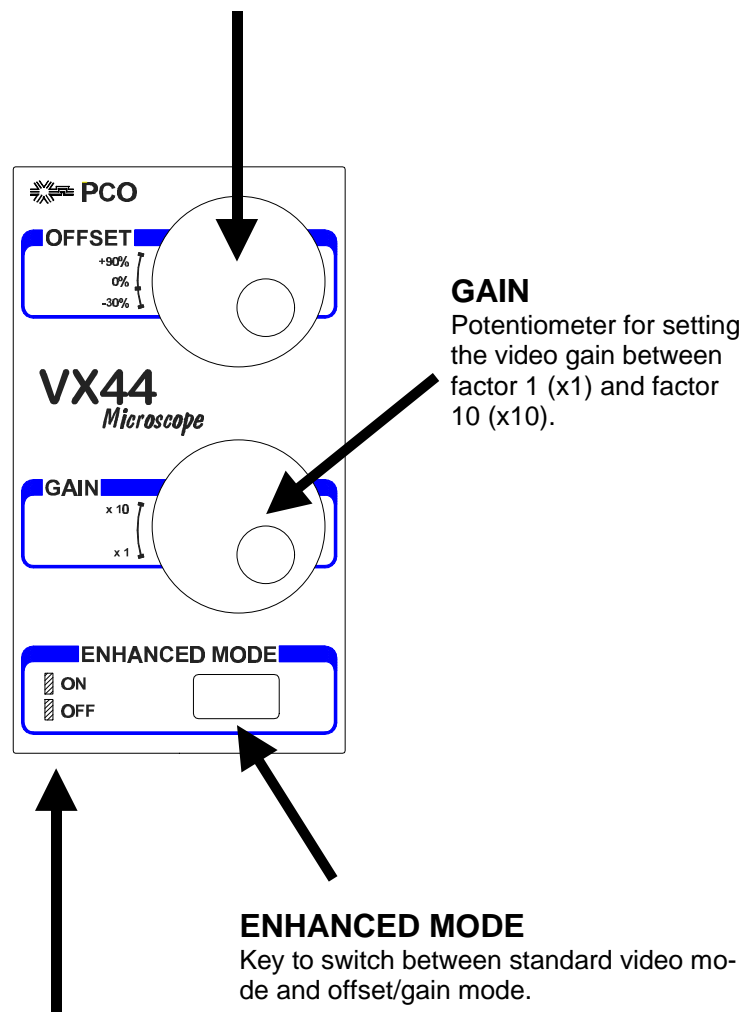
Some monitors need an external Sync-signal. In this case you need a connection between VIDEO OUT of the monitor and SYNC IN of the monitor.

3. Offset / Gain Controller

With the external controller the offset and the gain can be set. When the 'Enhanced Mode' is off, the camera works as a standard video camera, without the offset / gain function.

OFFSET

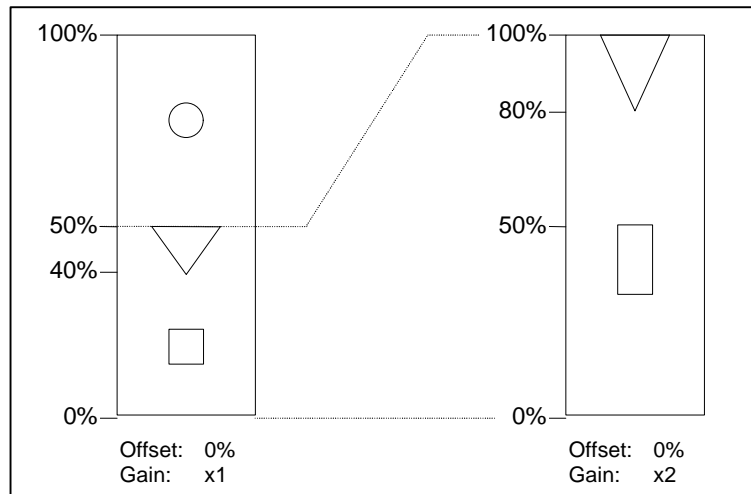
10-turns-potentiometer for tuning the Offset between -30% ... +90%.



LED

ON: Offset/gain setting active
OFF: Standard video mode active

3.1 Standard Video Mode



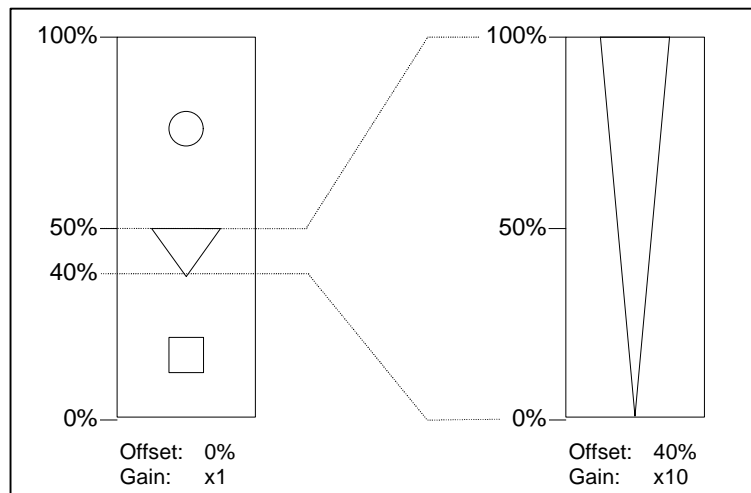
In this example the triangle is of interest for the application. There is a very low contrast between the information within the triangle and the information around.

No higher gain is possible, because the region of interest is already shifted to the maximum white level.

On the right side of the diagram the result is seen. There is no contrast enhancement possible.

3.2 Enhanced Mode

In the enhanced mode you can set a small window over the triangle by an offset:



Only the triangle will be gained with factor 10. Now you have the complete range of 100% on the 10% of the original information and therefore a contrast enhancement.

4. How to start?

Following connections have to be made before running the **VX44** after installing on a microscope or after mounting a C-Mount lens:

- Connection cable between **VX44** and the Controller.
- Power Supply to the camera.
- 75 Ω -cable (BNC) from camera to video monitor.

Switch-on the Power Supply. The system runs automatically in the standard mode. Standard mode means, offset is 0%, gain factor is 1, like a standard video camera. You have to see an image on the monitor screen.

With the black button on the controller you can toggle between this standard mode and the enhanced mode. The selected mode is shown by the lighting LED.

In the enhanced mode, you can set an offset and the gain.

5. Servicing, Maintenance and Cleaning Instructions

5.1 Service and Maintenance of the Camera

The camera system is maintenance-free.
Factory adjustments require no special inspections or servicing.

Protect the camera from hard shocks, keep it dry, and avoid extreme variations in temperature.
Use a dry and soft cloth to clean the housing.

5.2 Cleaning Method for the Lens

Before using an optical cleaning agent, remove dust particles using dry air. Never wipe the dust particle away in a dry state. The optical part and the input window of the image intensifier may be cleaned with only suitable cleaning agents such as pure alcohol, pure acetone or cleaning fluids from specialised photo shops. Using a soaked cotton swab wipe only the glass surface. Avoid touching any metal or plastic surfaces, since micro particles can be detached from these surfaces and cause irreparable scratches to the glass surfaces.

As a precaution, the lens glass surface should only be cleaned when necessary, and under no circumstances cleaning agents such as gasoline, nitro solvents, etc. should be used.

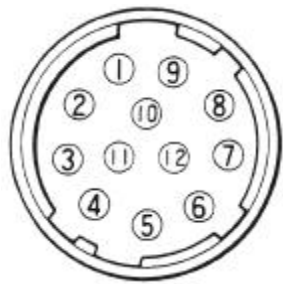
To prevent dust on the optical parts, it is recommended the dust protection filter be mounted at once after dismounting the lens. Do not handle or transport the camera without the protection filter in place.

All warranties are void if improper cleaning methods are used to clean the optical surfaces.

6. Pin Assignment

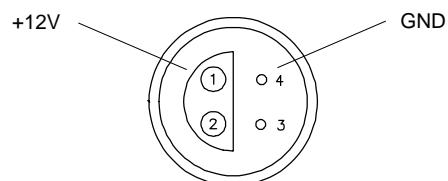
6.1 Pin Assignment of the 12 pin socket

Standard pin assignment of the 12-pin socket at the back panel of the camera:



pin	signal name	level	function
1	POWER GND		gnd
2	POWER +12V	+12V DC	input power, 2.8W
3	-	-	optional, not connected
4	GAIN +	10V	gain
5	GAIN -	5V	gain
6	OFFSET +	10V	offset
7	OFFSET TAP	5V	
8	OFFSET -	0	offset
9	ENHANCED	10V	
10	-	-	optional, not connected
11	-	-	optional, not connected
12	-	-	optional, not connected

6.2 Pin Assignment of the 4 pin LEMO socket



pin	signal name	level	function
1	POWER +12V	+12V DC	input power
2	-	-	optional, not connected
3	-	-	optional, not connected
4	POWER GND	0V	power ground

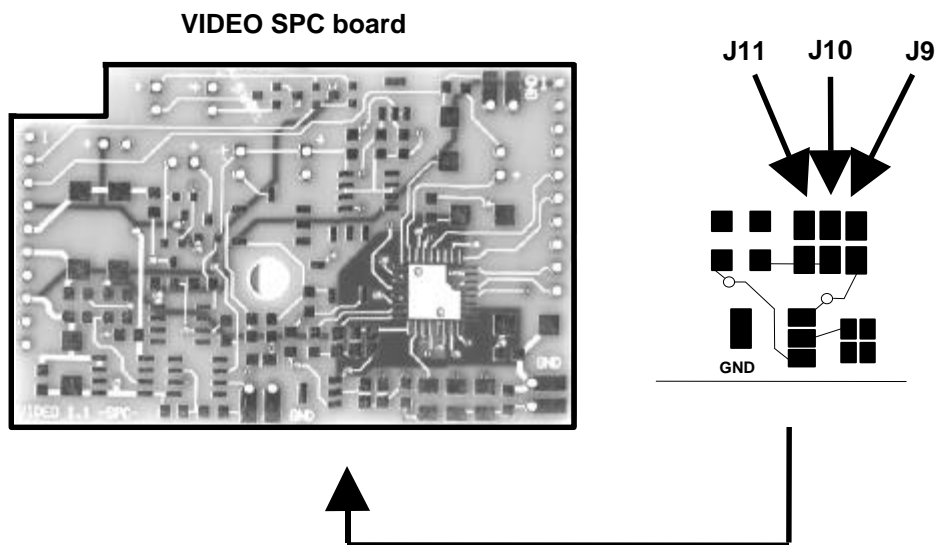
7. Gamma Correction

The operator can choose between two gamma settings:

- linear
- gamma

The gamma correction is preset by factory to "gamma". If you want to change it, internal changes are necessary!

1. Open the camera (4 screws).
2. Turn the camera that the upper (smaller) board *VIDEO SPC* is in the same position as shown below.



γ -setting	J9	J10	J11
Linear	off	on	off
Gamma	off	off	on

factory preset

Other combinations are not allowed!

8. Appendix

Customer Service

Having a problem or a question about matters not handled in these Operating Instructions, we recommend to contact us:

... by phone	+9441 / 2005-0
... by fax	+9441 / 2005-20
... by email	support@pco.de



For a quicker reply we need following information:

- short description of the problem
- experiment conditions
- camera serial number S/N (on the label placed on the bottom of the camera)

Warranty

PCO grants a 12 month warranty period for the camera and power supply. The warranty period starts on day of delivery ex-factory. In case of defect within the warranty period replacement or repair will be made (at PCO's discretion) free of charge. The device shall be returned on customer's expenses to PCO, preferably in the original package.

Image intensifiers are subject to the original manufacturer's warranty conditions

PCO is not liable for consequential damages.

Before returning the camera, contact PCO via any of the Customer Services.

Pay attention to use a sufficient package if you have to send the camera via mail (keep the original package).

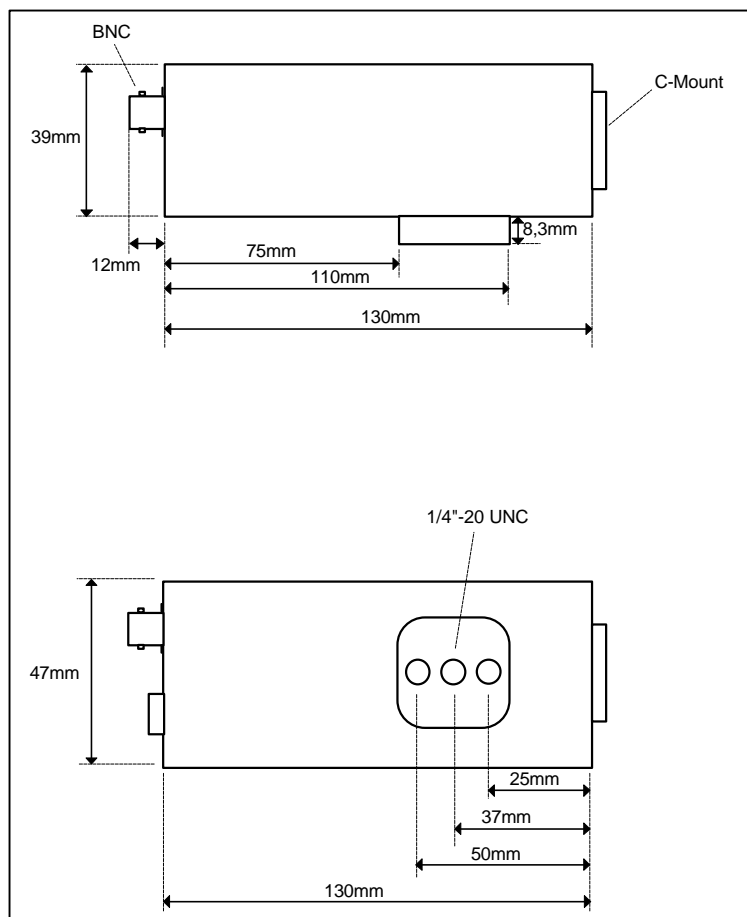
Attention Opening of the camera or improper handling (e.g. damage by electrostatic charge, wrong cleaning method) voids the warranty.

CE-Certification

VX44 complies with the requirements of the „EMC Directions of the European Communities (089 / 336 / EWG)“ and therefore bears the CE-Marking.

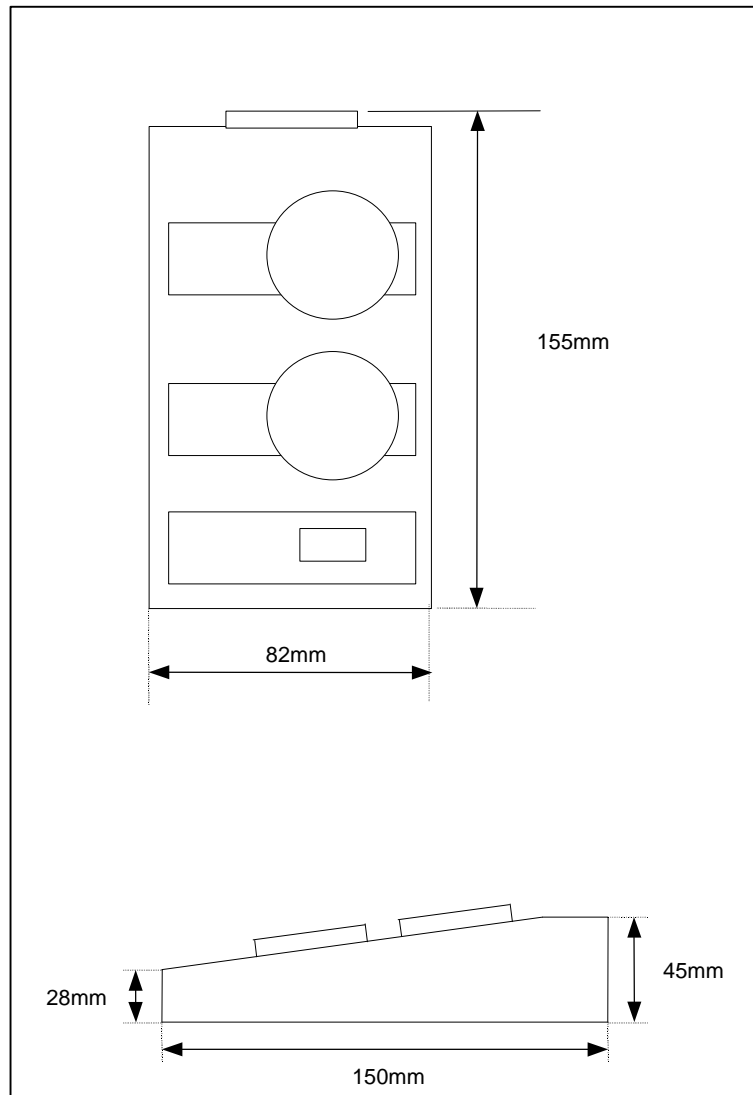
Dimensions and Weight

Camera



Weight: about 300g

Controller



Weight: about 230g

System Data

Video Standard	CCIR	RS170
CCD Sensor	SONY Interline Transfer CCD 2/3" with "lens-on-chip"	
Pixel Resolution	741(H) x 576(V)	756(H) x 486(V)
Active sensing area	8.6mm x 6.5mm	8.8mm x 6.6mm
Pixel Size	11.6µm x 11.2µm	11.6µm x 13.5µm
Horizontal Scanning Frequency	15.625kHz	15.734kHz
Vertical Scanning Frequency	50Hz	60Hz
Aspect Ratio	4/3 (hor./ver.)	
Video Output	CCIR-/RS170-Standard (1Vpp, 75Ω)	
max. Sensitivity	0.15lx (F=1.0)	
max. S/N ratio	55dB	
Gamma	gamma linear *	
Storage Mode	FRAME interlaced FIELD interlaced * FIELD non-interlaced *	
Gain Control	x1 ... x10 adjustable with potentiometer	
Offset Control	-30% ... +90%, adjustable with 10-turns- potentiometer	
Enhanced mode select	off: x1 (gain), 0% (offset) on: selectable gain and offset	
Connection cable	2m	
Power Supply (regulated)	input: 100V ... 250V AC (IEC connector) system: 12VDC/0.5A	
Certification	CE certified	

* Internal changes necessary.

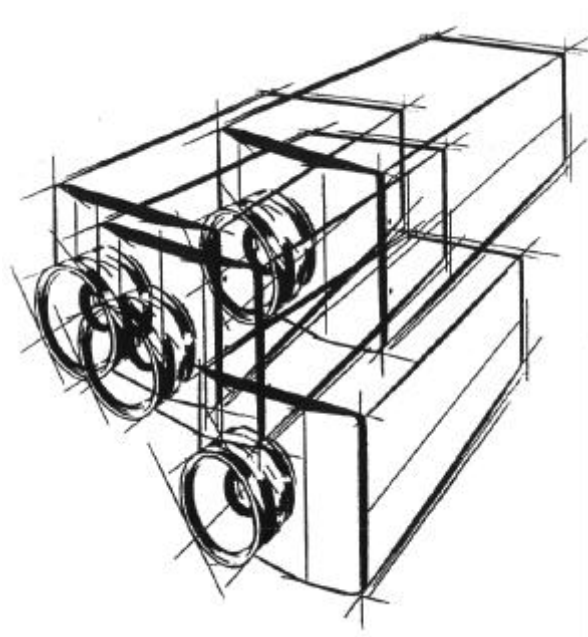
Dear Customer,

We hope the **VX44** will be an always valuable tool for your scientific day in, day out work.

Comments, suggestions or any new idea on our system are welcome.

We are at your disposal at any time, also after your buying of this camera.

Your PCO Team



PCO
CCD IMAGING

